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LISTS OF SPECIES

Fishes of the N'sele River (Pool Malebo, Congo basin, Central Africa): a list of species collected in the main channel and affluent tributaries, Kinshasa Province, Democratic Republic of Congo

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ABSTRACT: A list of fishes collected in the N'sele River, a large affluent tributary of Pool Malebo, in the Democratic Republic of Congo is provided. Sites along the main channel and its affluent tributaries were sampled and 148 species distributed in 27 families are reported. Despite close proximity to the megacity of Kinshasa, the ichthyofauna of the N'sele River has not previously been documented, and in the course of the current study, 19 of the 148 species are recognized as new records for the region. Due to difficulties of access much of the middle reach of the N'sele River remains to be inventoried and, while the present report documents high diversity in this system, the list is likely to be incomplete. Although preliminary, the current report provides a solid foundation for further work in a region that is undergoing rapid environmental degradation.

INTRODUCTION

The N'sele River is the largest affluent tributary entering the Congo River at Pool Malebo (formerly Stanley Pool), a 25 km-wide and 35 km-long expansion of the river that forms the boundary between the lower and middle Congo ichthyofaunal regions (Stiassny *et al.* 2011). The confluence of the N'sele river is located at the southeast of Pool Malebo, about 30 km from the center of the megacity of Kinshasa. The N'sele headwaters arise near the Angolan border, in the foothills of the Kasai Shield, at an elevation of about 900 meters above sea level (m.a.s.l.) and descend gradually through the rich alluvial N'sele Valley more or less due south to the Pool at an elevation of 280 m.a.s.l. (Figure 1). The river is relatively short and flows over a straight-line distance of only some 170 km, however for much of its reach the N'sele main channel is highly sinuous. Georeferenced sonar depth data collected from the confluence with Pool Malebo upstream along a stretch of approximately 50 km indicate that dry season (June – August) depths in the main channel average between 2–4 m, but depths of less than 1 m were recorded in many places along the channel (Figure 2), rendering navigation problematical (Poll 1959). Flow in the main channel is generally strong throughout the year and, due to extensive erosion in the basin, N'sele waters carry a heavy sediment load into Pool Malebo. While for much of its length the N'sele is shallow and highly sinuous, flowing over a predominately sandy substrate, in its upper reaches rapids interrupt the river as the main channel gradually widens and descends in elevation. A dense secondary network of tributaries of varying sizes, draining often markedly different biotopes, supply both banks of the N'sele main channel, and the entire watershed covers an area of approximately 6,000 km^2 (Mota *et al.* 1998).

The N'sele River basin is undergoing rapid and accelerated transformation due to a range of anthropogenic activities. The rich alluvial N'sele valley plays a major role in providing food crops to Kinshasa, and indiscriminate forest clearance, slash and burn agriculture, and subsequent erosion and run off of chemical fertilizers are impacting water quality throughout this and neighboring basins (UNEP 2013). Much of the riparian cover along the main channel of the river is heavily degraded, or completely cleared for fire wood for local consumption or, more intensively, for charcoal production in makeshift kilns that dot the river banks (Figure 3A). Charcoal is exported down river (Figure 3B) in large quantities for sale as cooking fuel in Kinshasa (Schure *et al.* 2011). Loss of riparian cover has exposed the riverbanks to extensive erosion, which is clearly evident along the entire reach of the main channel sampled during the current surveys (e.g., Figure 3 C and D).

Despite close proximity to Kinshasa and the importance of the river and surrounding catchment to the local economy, remarkably little information has been published on the fishes of the N'sele River. Poll (1958; 1959) provides an inventory of the fishes of Pool Malebo, and notes that the two main affluent tributaries (N'djili and N'sele Rivers; Figure 1) harbor a distinctive fish fauna, but provides little further detail beyond a listing of 83 species that he recorded as present in "rivers and neighboring waters" of the Pool.

In view of the growing threats, and in the absence of an authoritative account of the fishes of this system, we herein provide a preliminary listing of species collected in the N'sele River main channel and from affluent tributaries.

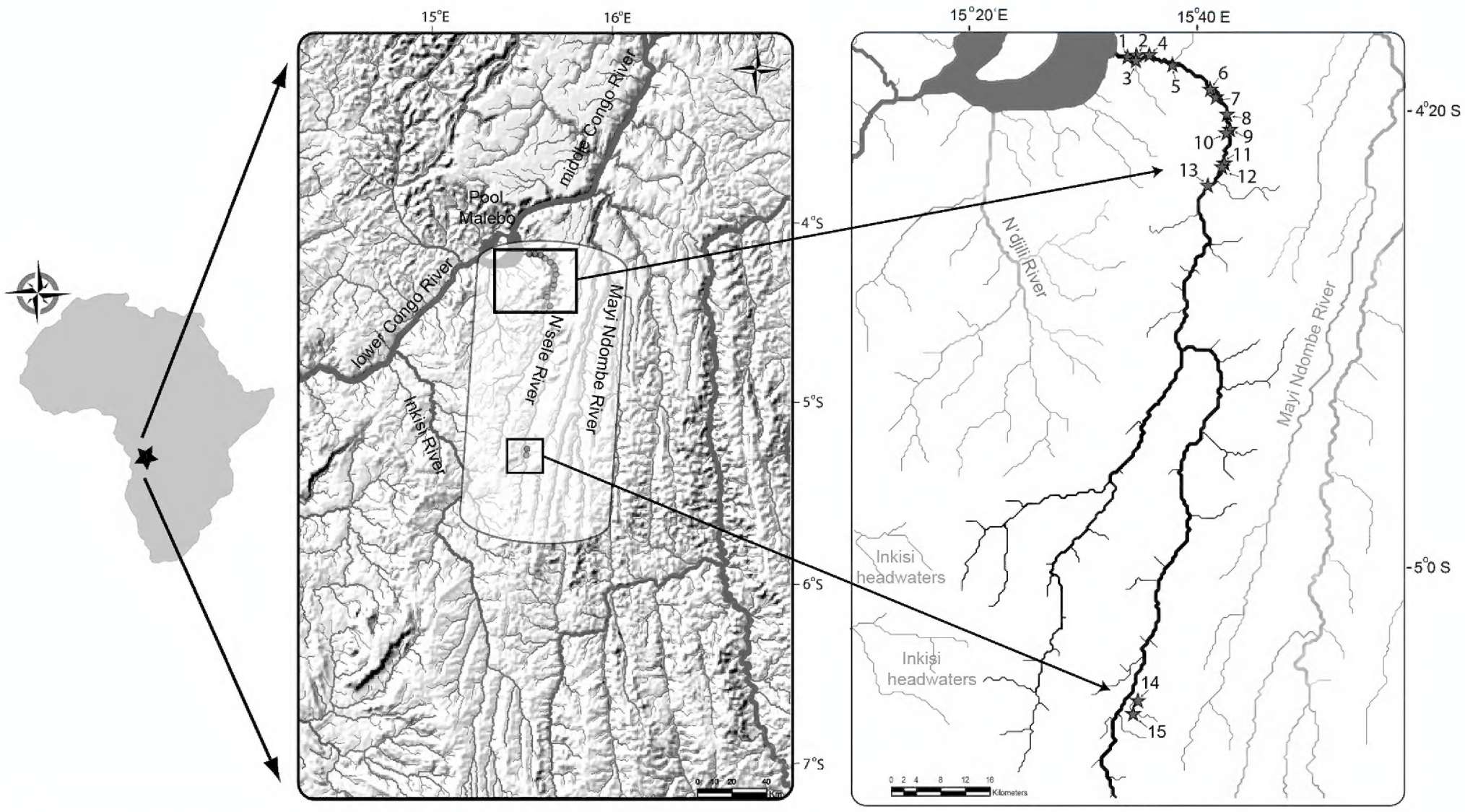

FIGURE 1. Location of N'sele River and associated drainages into Pool Malebo, with collection sites numbered (rhs).

MATERIALS AND METHODS

The list of species provided here is based on collections made during three field expeditions to the N'sele region, two during the dry season (July-August 2009, 2011), and one during the protracted rainy season (March 2010). Collections made at fifteen sites along two stretches of the N'sele River are reported on (Table 1, Figure 1). Sites 1-13 are located from the river mouth to approximately 50 km upstream, a reach that was accessible by shallow draft local pirogue. Sites 14 and 15 are located in tributaries of the upper N'sele, at least 85 km upstream from sites 1–13, and accessible from the south by road from the town of Mbanza-Ngungu in Bas Congo Province. Sites were selected to sample accessible regions of the river and affluent streams, representing a diversity of riparian habitats and subjected to varying degrees of anthropogenic impact (Figures 4, 5 and 6). Fishes were collected and euthanized prior to preservation in accordance with recommended guidelines for the use of fishes in research (AFS/AIFRB/ASIH, 2003). All materials reported on in this study are housed in the Ichthyology Department of the American Museum of Natural History (AMNH), New York, and associated data are accessible at http://sci-web-001.amnh.org/db/emuwebamnh/index.php.

A georeferenced sonar depth data trace was compiled for the surveyed 50 km reach of the N'sele River main channel (Figure 2). Universal Transverse Mercator (UTM) coordinates were obtained using a Trimble Ag132 GPS receiver with Omnistar satellite-based differential correction (DGPS), and sonar depth data was measured using a Cruz Pro ATU-120B sonar transducer with 300 m depth capability. The GPS and sonar equipment was affixed to a wooden pirogue with the sonar transducer fastened to a hinged pole mounted at the gunwale and enclosed within a plastic water bottle to eliminate drag-caused cavitation across the face of the sensor.

Notes on Collection Sites

Site 1 (downstream of N'sele bridge, Figures 4A, 5A) collection made in main channel in shallow water along the bank in reeds and emergent grasses. Water flowing rapidly over a sandy substrate with muddy accumulations near shore, width of channel about 90 m. Site 2 (Malebo, Figure 4A, 5B) a shallow water embayment of the main channel, collection made behind sand spit. Banks mostly denuded, but with some grasses and reeds along the sandy shoreline. Site 3 (Nganda Yala, Figures 4A, 5C) commercial port and boat landing, heavily disturbed area. Collections made along sandy shore and in fringing grasses. Site 4 (N'sele between Benzale and Manzambi, Figures 4B, 5D) collection made in main channel along bank in reeds and emergent grasses, at depth of 1.5 m. Rapid water flow over a mixed substrate of sand, mud and woody debris. Width of channel about 40 m. Site 5 (Mopimbi River, near confluence, Figures 4B, 5E) collections made from confluence to 200 m upstream. Clear water flowing rapidly over a sand-mud substrate at depths ranging from 2-3 m near the confluence to 5 m further upstream. Surrounding gallery forest highly degraded for firewood and charcoal production. Site 6 (Koke ya Mbila River, near confluence, Figure 4C, 5F) a large forested tributary that arises in the eastern portion of the Bombo Lumene hunting reserve. In the section surveyed gallery forest is more or less intact, and clear water flows over a sandy substrate, intermixed with patches of fine gravel and silt. Banks shaded, undercut with overhanging vegetation. Site 7 (Mopili River, near confluence, Figure 4C, 5G) deep (5 m), heavily silt-laden waters flow over a sand and mud substrate through severely degraded gallery forest in a region of intensive agricultural activity. Site 8 (Bokungu River, near confluence, Figure 4D, 5H) a small, shallow, clear water stream flowing slowly over a fine sandy substrate. Gallery forest intact and stream banks shaded,

with numerous emergent root wads and macrophytes. Site 9 (N'sele below Kisangani Village, Figure 4D, 6A) collections along shoreline, in shallow, still water over a sandy substrate with muddy accumulations near shore, width of channel about 70 m. Surrounding region heavily denuded of vegetation. Site 10 (Mayi Mpembe River, near confluence, Figure 4D, 6B) a large, left bank tributary flowing through savanna grasslands, with heavily degraded riparian cover. In the region collected, water flow is fast and deep (4-5 m), with a substrate of pebble and sand mix. Site 11 (Ngadiadia River, near confluence, Figure 4E, 6C) a medium sized, right bank tributary flowing through heavily degraded gallery forest and large grassy banks with numerous reed beds. Flow is strong and fast, but water depth relatively shallow, about 2.5 m at maximum depth. Substrate is sandy with large muddy accumulations in backwaters. Site 12 (Masaba River, near confluence, Figure 4E, 6D) smaller than preceding site, but similar with strong flow over relatively shallow (2.5 m) depths. Riparian cover of dense grasses with numerous reed beds in the region collected. Upstream the basin is heavily degraded with forest clearance for agricultural development and livestock grazing (Figure 6H). Site 13 (Mushie River, near confluence, Figure 4F, 6E) a small, relatively shallow (2 m at deepest points) stream with relatively rapid flow in the main channel but with many still backwaters. Substrate is mainly mud but with patches of sand and fine gravel interspersed. The stream flows through dense, relatively intact gallery forest and is heavily shaded with numerous emergent and floating macrophytes, and fallen logs. Site 14 (Tubi River, 1.5 km from confluence with Upper N'sele, Figure 4G, 6F) a small, black water stream flowing through a patchwork of cleared or heavily degraded forest with intensive market garden development throughout the region. Riparian cover denuded for charcoal production and firewood. The stream is shallow (1–1.5 m) with moderate flow over a fine sand substrate with dense accumulations of leaf litter and woody debris. Site 15 (Zodi River, 3 km from confluence with Upper N'sele, Figure 4G, 6G) a shallow (1–1.5 m), clear water stream with rapid flow over bedrock. Riparian zone of degraded secondary growth forest.

Fish sampling

Standard fishing techniques were employed (Lang and Baldwin, 1996) and, depending on habitat and conditions, included dip, cast, fyke, and seine nets, as well as hook and line. To ensure comprehensive sampling in isolated stretches of affluent tributaries, and with permissions, the controlled use of the ichthyocide rotenone was employed. Where adequate locality data was available, additional fishes were purchased from local fishermen who fish mainly in the main channel of the river with cast nets deployed from local pirogues.

Taxonomic nomenclature follows Brooks *et al.* (2011), which is based primarily on Eschmeyer (1998) but with a

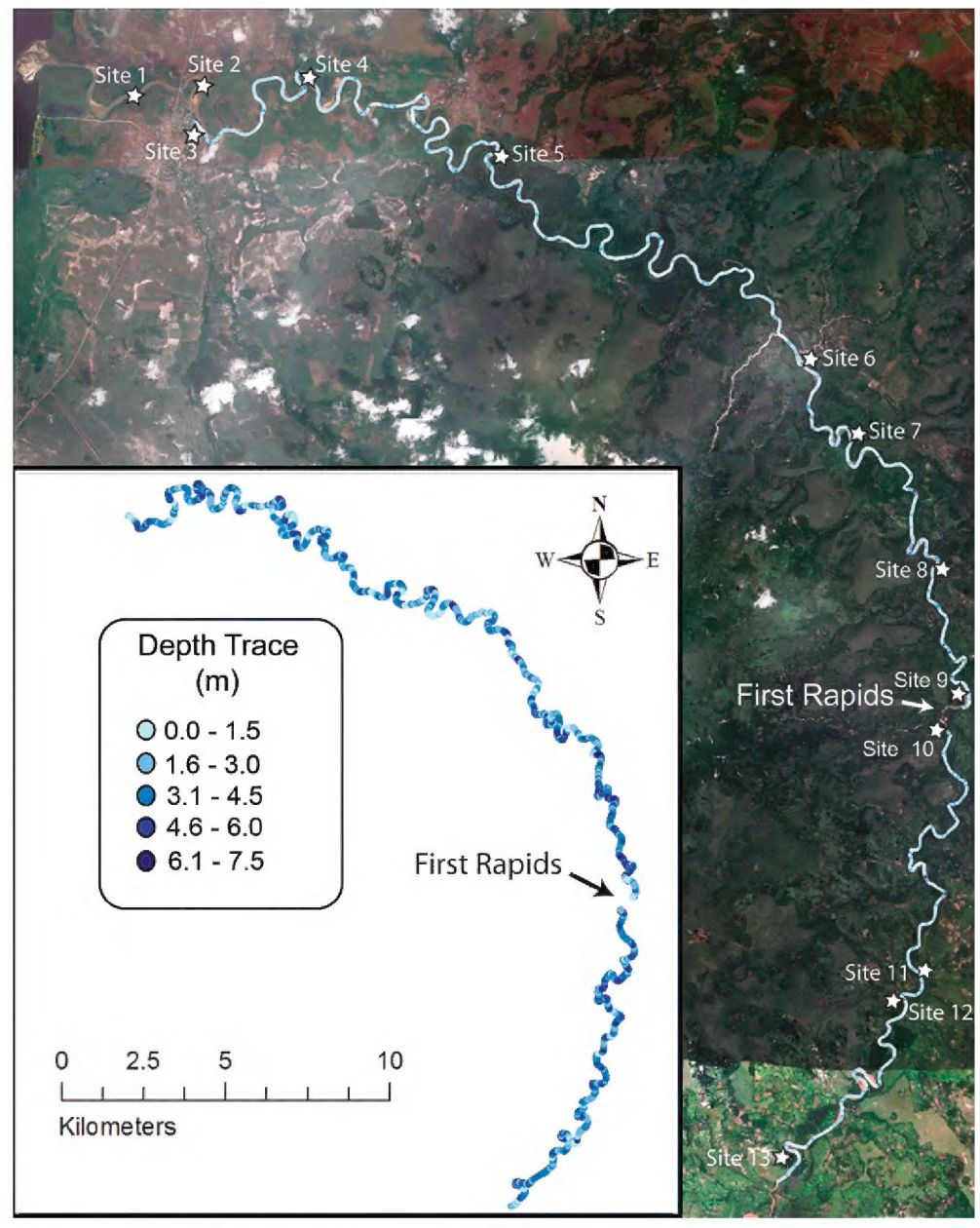

FIGURE 2. Depth variation measured along a 50 km stretch of the N'sele River (August 2009). Georeferenced sonar depth trace is superimposed on a Google Earth projection (rhs).

TABLE 1. Collecting sites: geographic and physicochemical data.

SITE	LOCALITY	COORDINATES	ELEVATION	LOCATION	Surface T°C	pH
1	Downstream of N'sele bridge	4°15'8.53" S, 15°33'53.75" E	272 m	Main channel	27.0	6.1
2	N'sele at Malebo	4°14'59.60" S, 15°34'42.00" E	275 m	Main channel	26.3	6.1
3	Ngandayala	4°15'27.43" S, 15°34'37.62" E	275 m	Main channel	25.7	6.0
4	N'sele between Benzale and Manzambi	4°14'57.52" S, 15°35'49.13" E	278 m	Main channel	24.2	6.7
5	Mopimbi River	4°15'48.71" S, 15°37'50.88" E	288 m	Rightbank tributary	23.9	6.1
6	Koke ya Mbila River	4°17'59.37" S, 15°41'11.20" E	291 m	Rightbank tributary	25.8	5.9
7	Mopili River	4°18'41.90" S, 15°41'40.78" E	295 m	Rightbank tributary	26.2	6.0
8	Bokungu River	4°20'10.21 S, 15°42'38.52" E	303 m	Rightbank tributary	24.0	6.2
9	N'sele below Kisangani Village	4°21'31.90 S, 15°42'54.14" E	299 m	Main channel	25.6	5.8
10	Mayi Mpembe River	4°21'49.57 S, 15°42'36.47" E	313 m	Leftbank tributary	26.2	6.0
11	Ngadiadia River	4°24'29.41 S, 15°42'25.56" E	318 m	Rightbank tributary	24.5	6.3
12	Masaba River	4°24'48.51 S, 15°42'12.09" E	317 m	Leftbank tributary	25.1	6.1
13	Mushie River	4°26'29.93 S, 15°40'58.88" E	321 m	Leftbank tributary	24.3	6.0
14	Tubi River, Upper N'sele	5°11'38.0 S, 15°34'49.4" E	468 m	Rightbank tributary	20.0	6.2
15	Zodi River, Upper N'sele	5°12'47.9 S, 15°34'24. 8" E	497 m	Rightbank tributary	21.0	5.6

Figure 3. Habitat degradation: A) Charcoal kiln (lhs) and sacked charcoal awaiting collection for transport down river; B) Charcoal sacks being rafted down river for sale in Kinshasa; C) Cleared bank resulting in erosion of sand into the channel; D) Forest clearance and resultant erosion.

few modifications. Ordinal classification follows Wiley and Johnson (2010). All fishes were collected and exported with permission of the République Démocratique du Congo, Ministère de l'Agriculture, Secrétariat Général à l'Agriculture, Pêche et Elevage, Direction des Pêches (Permit# 02/DP/SG/AGRI/2009, Permit# 07/DP/SG/AGRI/2010, and Permit# 017/DP/SG/AGRI/2011, on file at AMNH).

Results and Discussion

A total of 2210 individuals belonging to 148 species, distributed in 27 families and 15 orders are represented in Table 2, with their distribution among sites indicated in columns 1-15. In column 16 distribution data culled from the IUCN assessment of the status and distribution of central African fishes (Brooks *et al*. 2011), is used as the best available source to indicate which species have previously been recorded as present in the N'sele region. Based on these data we recognize 19 species (Table 2, column 16) that have not previously been recorded from Pool Malebo or surrounding regions, and a selection of these is illustrated in Figures 7–9.

Despite proximity to the megacity of Kinshasa, access to the N'sele River remains difficult and in the course of the present study we have been able to survey the main channel and associated tributaries along a relatively short course of the river. Much of the middle reach of the river remains to be surveyed and it is probable that the full tally of species from the system will be higher than that reported here. Despite these limitations, a total of 148 species is noteworthy for an African river of this size, particularly given the homogeneous nature of the main channel and highly degraded state of much of the basin. By comparison, a recent survey of the nearby, and considerably larger, Inkisi River (Figure 1), recorded the presence in that system of only 61 species (Wamuini Lunkayilakio 2010). Similarly, a comprehensive study of the Lefini River, a large right bank affluent tributary of the middle Congo in the Republic of Congo with a drainage area more than twice that of the N'sele, reported the presence of 140 species in that system (Ibala Zamba 2010).

The location of the N'sele basin may partly account for the unexpected richness of its fish fauna. The headwaters of the larger left bank tributaries of the N'sele are located in close proximity to those of the Inkisi River, a major left bank tributary of the lower Congo River (Figure 1), and the presence in the N'sele (but absence in Pool Malebo) of species such as *Paramormyrops cf. kingsleyae, Barbus vanderysti*, *Garra ornata* and *Clariallabes manyangae*, may reflect faunal exchange during periods of flooding or past stream capture with the Inkisi. Similarly headwaters of some larger right bank tributaries of the N'sele are located in close proximity with those of the Mayi-Ndombe (Black) River, a large left bank tributary of the middle Congo River (Figure 1). The presence in the N'sele of taxa such as *Marcuseius kutuensis*, *Barbus humeralis*, *Amphilius maesii*, *Phractura scaphyrhynchura* and *Heterochromis multidens*, species more typical of the middle Congo (but absent from Pool Malebo), may reflect that association. And of course the outflow of the N'sele into Pool Malebo provides ample opportunity for colonization to and from the Pool, and the presence in the N'sele of species such as *Leptoglanis xenognathus*, *Belonoglanis brieni, Clariallabes teugelsi and Poropanchax myersi* suggests such an interchange.

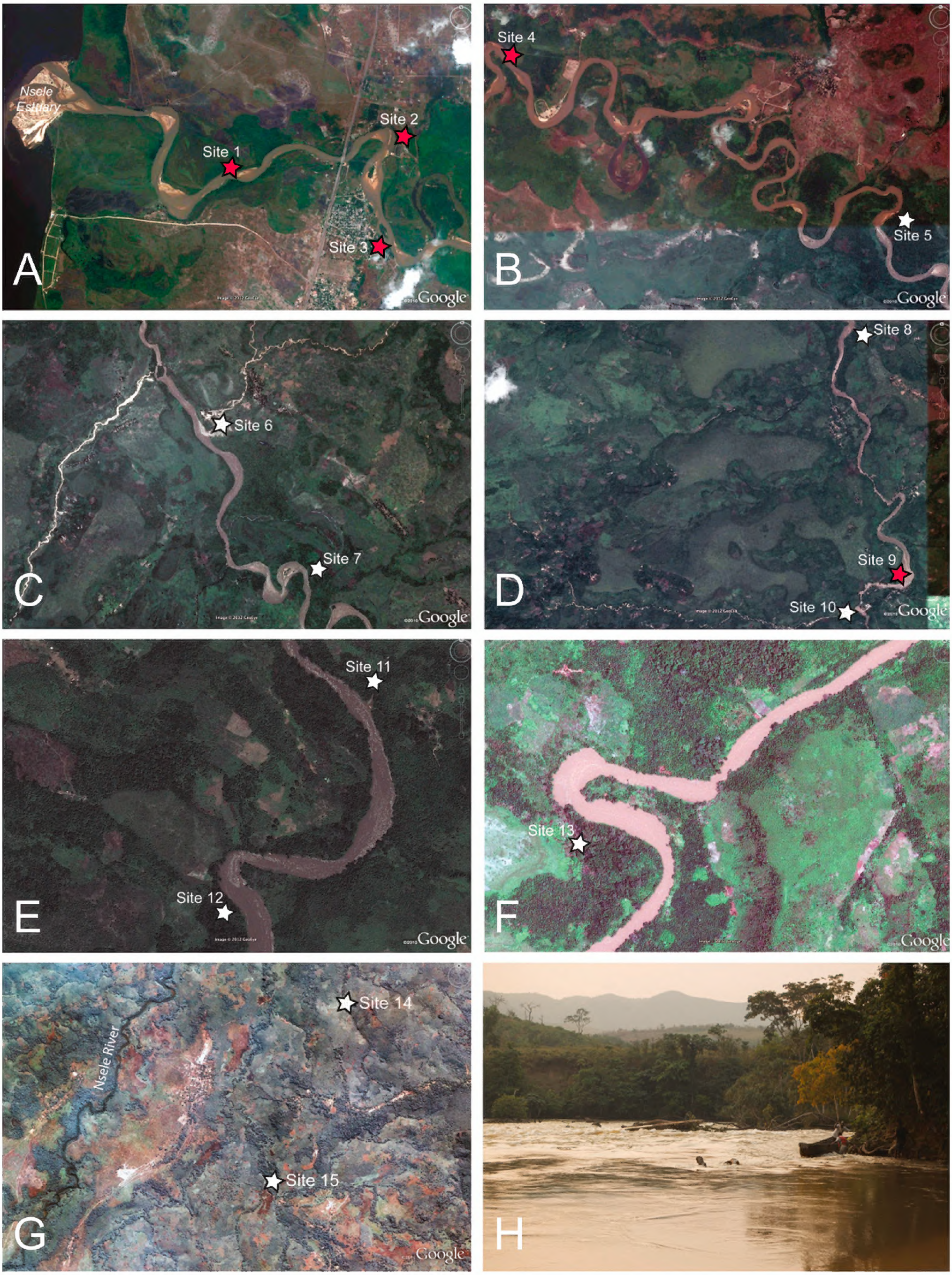

FIGURE 4. Google Earth projections: A) – G) Collection site locations and surrounding land cover. Red stars indicate main channel collections and white stars indicate collections within affluent tributaries. H) First cross channel rapid on the N'sele main channel, located about 40 km upstream of the river mouth.

Figure 5. Sampling sites: A) Aerial view, downstream of N'sele bridge, white arrow indicates site; B) N'sele at Malebo; C) Ngandayala; D) between Benzale and Manzambi; E) Mopimbi River; F) Koke ya Mbila River; G) Mopili River; H) Bokungu River.

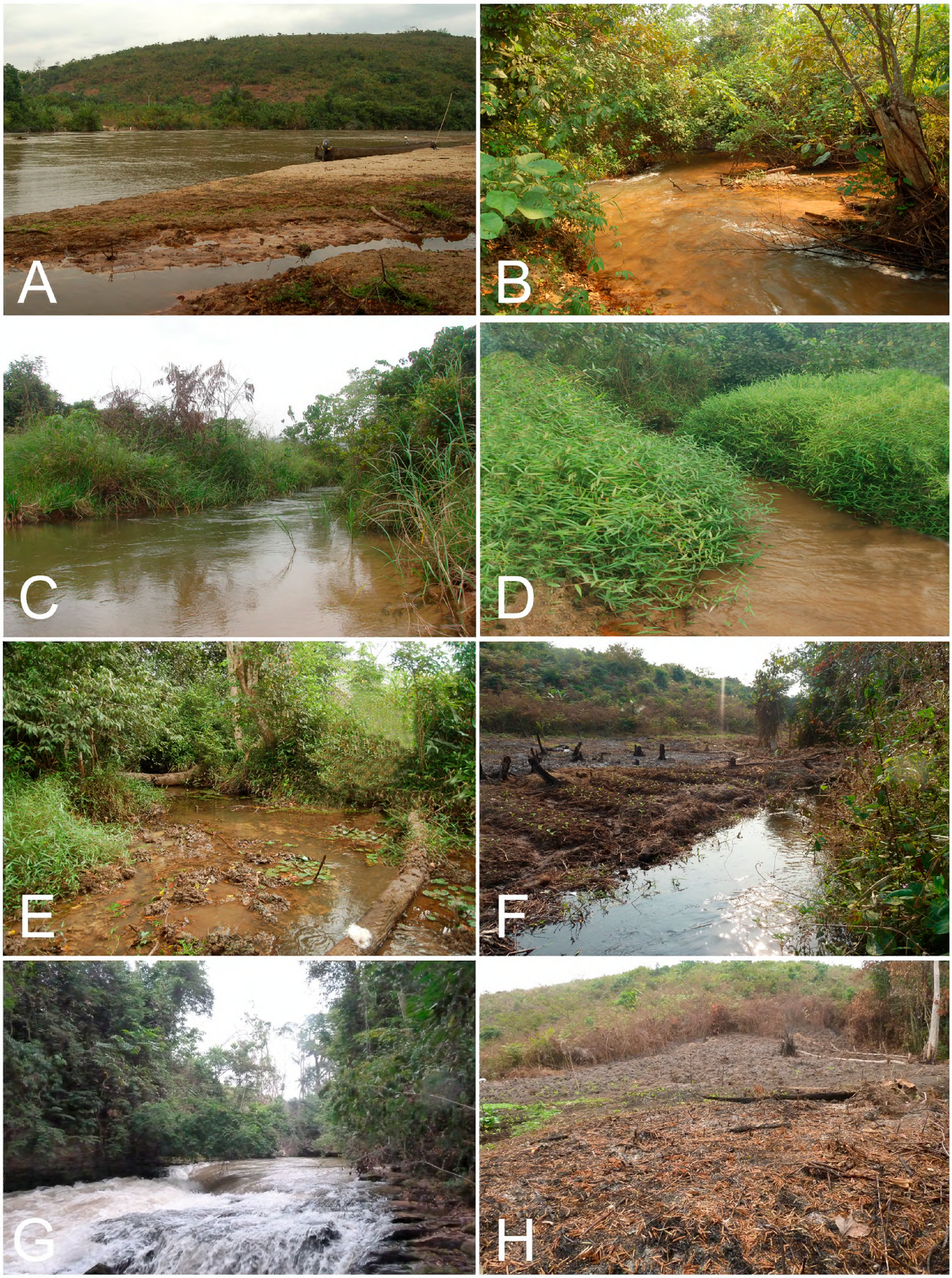

Figure 6. Sampling sites: A) below Kisangani Village; B) Mayi Mpembe River; C) Ngadiadia River; D) Masaba River; E) Mushie River; F) Tubi River, Upper N'sele; G) Zodi River, Upper N'sele; H) Forest clearance 2 km upstream of Masaba River (site 12) for garden plots.

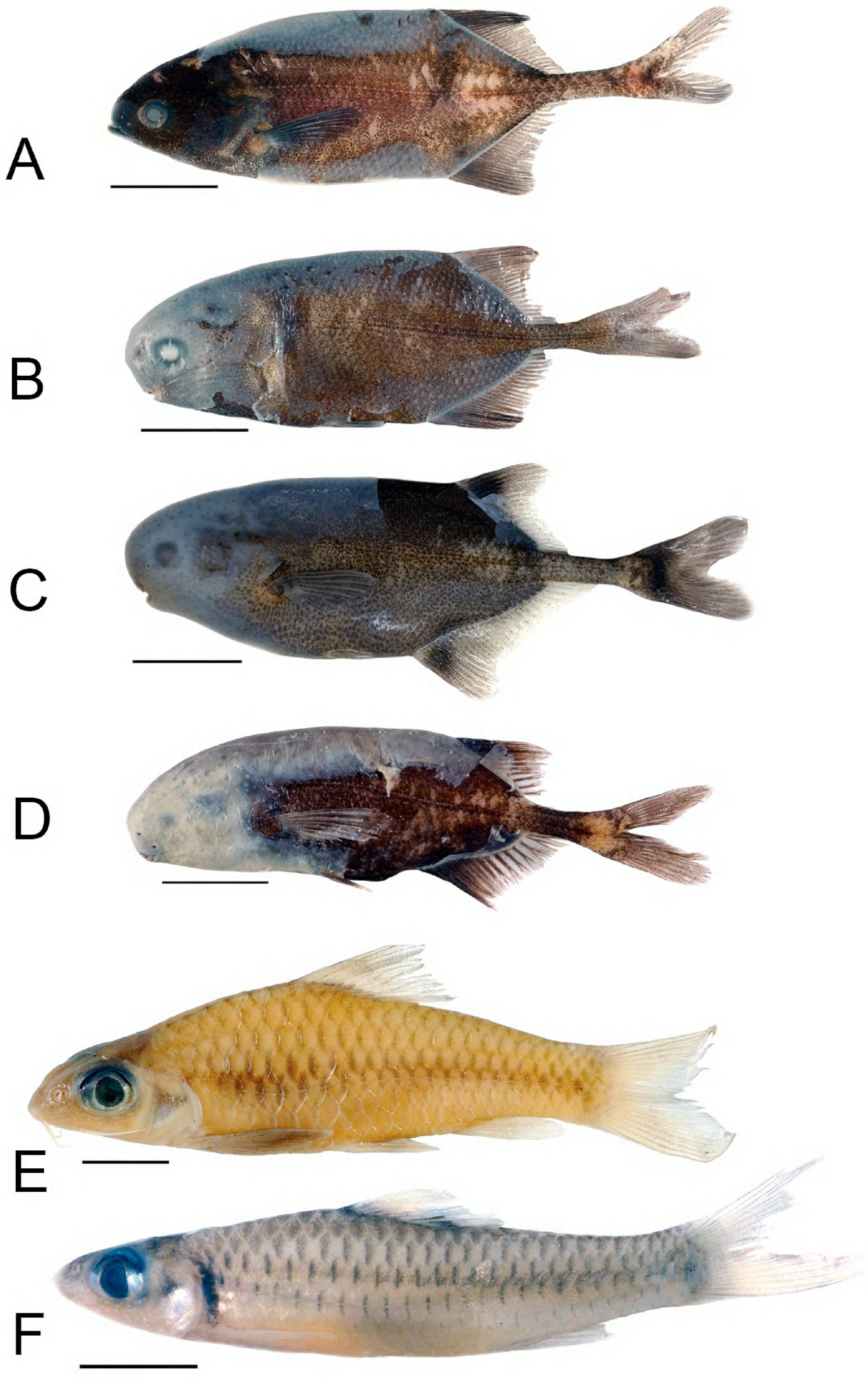

FIGURE 7. Selected species considered as new records for the region: A) *Marcusenius kutuensis*, B) *Pollimyrus adspersus*, C) *Pollimyrus maculipinnis*, D) *Stomatorhinus patrizii*, E) *Barbus humeralis*, F) *Barbus matthesi*. Scale bars: 1 cm.

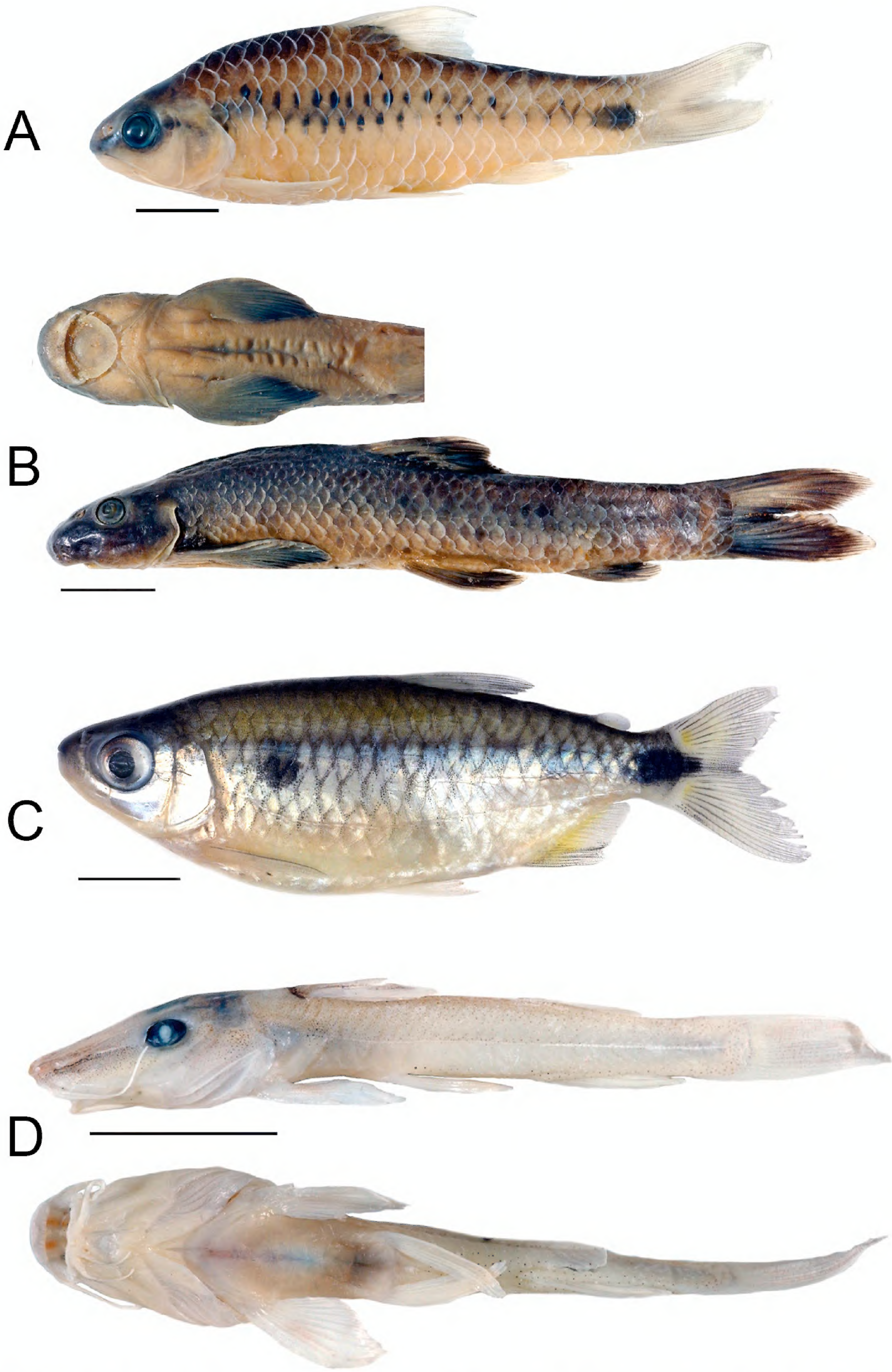

FIGURE 8. Selected species considered as new records for the region: A) *Barbus vanderysti*, B) *Garra ornata*, in ventral and lateral views, C) *Brycinus comptus*, D) Nsele "glass catfish", in lateral and ventral views . Scale bars: 1 cm.

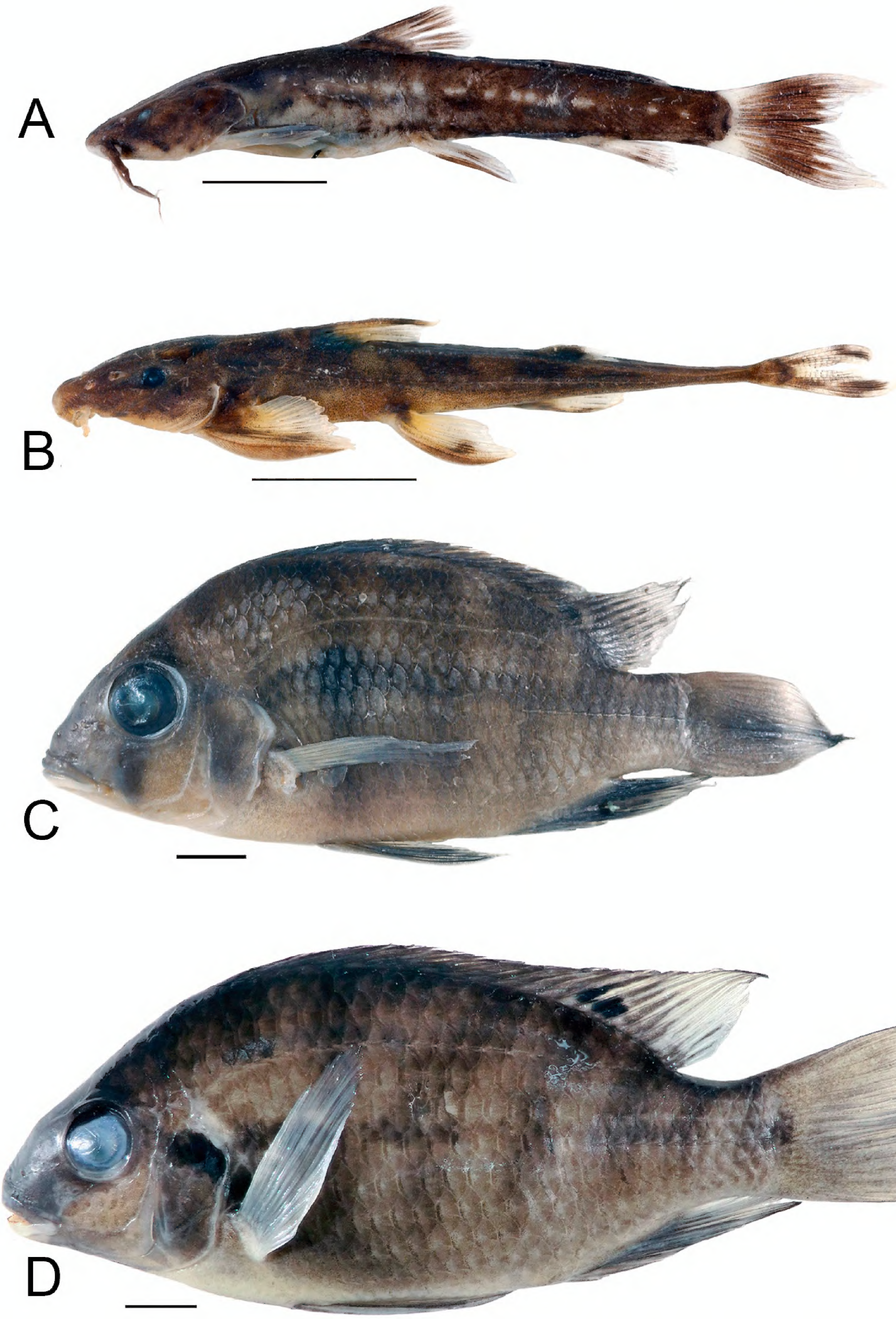

Figure 9. Selected species considered as new records for the region: A) *Amphilius maesii*, B) *Doumea angolensis*, C) *Heterochromis multidens*, D) *Tilapia* sp. Scale bars: 1 cm.

It is of interest to note that of the 148 species recorded from the N'sele, 45 were collected exclusively in tributaries (species in bold type in Table 2), and have yet to be found in the main channel of the river. While this may reflect an artifact of collecting effort throughout the channel, it is nonetheless suggestive that the N'sele tributaries, draining often markedly different biotopes, harbor a significant proportion of species richness in the system.

Table 2. List of species collected at sites 1-15. In column 16 distribution data culled from Brooks *et al.* (2011) is used to indicate which N'sele species are known to occur in Pool Malebo and/or adjacent regions. Species in bold were collected in affluent tributaries but not in the N'sele main channel.

TAXON	AMNH Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LEPIDOSIRENIFORMES																	
Protopteridae (1)																	
***Protopterus dolloi* Boulenger, 1900**	AMNH 252420	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X
POLYPTERIFORMES																	
Polypteridae (1)																	
Polypterus ornatipinnis	observed	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
OSTEOGLOSSIFORMES																	
Pantodontidae (1)																	
Pantodon buchholzi Peters,1876	AMNH 255341, 250750	X	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X
Notopteridae (2)																	
***Papyrocranus congoensis* (Nichols and La Monte, 1932)**	AMNH 254690, 252408	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	X
Xenomystus nigri (Günther, 1868)	AMNH 254750, 254535	-	-	-	X	-	-	X	-	-	-	-	X	X	-	-	X
Mormyridae (34)																	
Campylomormyrus elephas (Boulenger, 1898)	AMNH 245591	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
***Cyphomyrus discorhynchus* (Peters, 1852)**	AMNH 255276	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Cyphomyrus psittacus (Boulenger, 1897)	AMNH 252343	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Gnathonemus petersii Pellegrin, 1919	AMNH 250767, 254769	X	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X
Marcusenius fuscus (Pellegrin, 1901)	AMNH 254765	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Marcusenius greshoffii (Schilthuis, 1891)	AMNH 255360, 245589	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
***Marcusenius kutuensis* (Boulenger, 1899)**	AMNH 250768	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-
Marcusenius monteiri (Günther, 1873)	AMNH 252339	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Marcusenius moorii (Günther, 1867)	AMNH 250558, 250769	-	-	-	-	-	-	-	-	X	-	-	-	X	-	-	X
Marcusenius schilthuisiae (Boulenger, 1899)	AMNH 255354	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Marcusenius stanleyanus (Boulenger, 1897)	AMNH 252340	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
*Mormyrops anguilloides (*Linnaeus, 1758)	AMNH 255357	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Mormyrops attenuatus Boulenger, 1898	AMNH 255373, 252461	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
Mormyrops lineolatus Boulenger ,1898	AMNH 250977, 254764	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
Mormyrops mariae (Schilthuis, 1891)	AMNH 254545, 254768	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X
***Mormyrops masuianus* Boulenger, 1898**	AMNH 251004, 251006	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	X
Mormyrops nigricans Boulenger, 1899	AMNH 255352, 254680	X	-	-	X	X	-	X	-	-	-	-	X	-	-	-	X
Mormyrus bumbanus Boulenger, 1909	AMNH 250934, 250911	-	-	X	-	-	-	-	-	-	X	X	-	-	-	-	X
Mormyrus caballus Boulengeri, 1898	AMNH 252372, 254592	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-	X
Oxymormyrus boulengeri (Pellegrin, 1900)	AMNH 254753, 252350	-	X	-	X	X	-	X	-	-	-	-	-	-	-	-	X
***Oxymormyrus zanclirostris* (Günther, 1867)**	AMNH 250944, 250906	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	X
***Paramormyrops cf. kingsleyae* (Günther,1896)**	AMNH 255312, 255262	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
Petrocephalus binotatus Pellegrin, 1924	AMNH 252422	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
Petrocephalus christyi Boulenger, 1920	AMNH 255353, 252371	X	X	X	-	X	-	-	-	X	-	-	-	-	-	-	X

Table 2. ***Continued.***

TAXON	AMNH Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
***Petrocephalus grandoculis* Boulenger, 1920**	AMNH 254614	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X
Petrocephalus microphthalmus Pellegrin, 1908	AMNH 252342, 250981	-	-	X	-	X	-	-	-	X	-	-	X	-	-	-	X
Petrocephalus sauvagii (Boulenger, 1887)	AMNH 252362	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
Petrochepalus valentini Lavoué, Sullivan and Arnegard, 2010	AMNH 255279, 255372	X	-	X	-	-	-	-	-	X	X	-	-	-	-	-	X
Petrocephalus zakoni Lavoué, Sullivan and Arnegard, 2010	AMNH 255356, 255376	X	-	-	-	X	-	-	X	X	-	-	-	-	-	-	X
***Pollimyrus adspersus* (Günther, 1866)**	AMNH 254544	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Pollimyrus maculipinnis (Nichols and La Monte, 1934)	AMNH 250946, 250545	-	-	X	-	-	-	-	X	X	X	-	-	X	-	-	-
Pollimyrus nigripinnis (Boulenger, 1899)	AMNH 254547, 255355	X	-	-	-	-	-	X	-	X	-	-	-	-	-	-	X
Pollimyrus pulverulentus (Boulenger, 1899)	AMNH 255355, 250955	X	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-
***Stomatorhinus patrizii* Vinciguerra, 1928**	AMNH 254542, 252384	-	-	-	-	-	X	X	-	-	-	-	X	-	-	-	X
CLUPEIFORMES																	
Clupeidae (3)																	
Microthrissa royauxi Boulenger, 1902	AMNH 255308	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
***Poecilothrissa congica* (Regan, 1917)**	AMNH 255247	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
Potamothrissa obtusirostris (Boulenger, 1909)	AMNH 250544, 254607	-	-	-	-	X	-	X	-	X	-	-	-	X	-	-	-
GONORYNCHIFORMES																	
Phractolaemidae (1)																	
Phractolaemus ansorgii Boulenger, 1901	AMNH 254542, 246013	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
CYPRINIFORMES																	
Cyprinidae (17)																	
***Barbus humeralis* Boulenger, 1902**	AMNH 254600	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
Barbus matthesi Poll and Gosse, 1963	AMNH 254599, 250855	-	-	-	-	-	X	-	-	X	-	-	X	-	-	-	-
***Barbus miolepis* Boulenger, 1902**	AMNH 254671, 254599	-	-	-	-	X	X	-	X	-	X	-	X	X	X	X	X
***Barbus vanderysti* Poll, 1945**	AMNH 250937, 255270	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-
Chelaethiops congicus (Nichola and Griscom, 1917)	AMNH 250566, 250737	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
Chelaethiops elongatus Boulenger, 1899	AMNH 250737	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X
Clypeobarbus pleuropholis (Boulenger, 1899)	AMNH 254734, 255338	X	-	-	X	X	-	-	-	X	-	-	X	X	-	-	X
***Garra ornata* Nicholas and Griscom, 1917**	AMNH 254587, 250912	-	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-
Labeo lineatus Boulenger, 1898	AMNH 252344, 250974	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	X
Labeo longipinnis Boulenger, 1898	AMNH 255359	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
***Labeo macrostomus* Boulenger, 1898**	AMNH 250910	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
Labeo weeksii Boulenger, 1909	AMNH 255347, 252374	X	X	-	-	X	-	-	-	X	-	-	-	-	-	-	X
Leptocypris lujae (Boulenger, 1909)	AMNH 252330	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Leptocypris modestus Boulenger, 1900	AMNH 255245, 250551	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X
Leptocypris weeksii (Boulenger, 1899)	AMNH 255244, 250552	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X
Leptocypris weynsii (Boulenger, 1899)	AMNH 255284, 257811	-	-	-	-	-	-	X	-	X	X	-	-	-	-	-	X
Raiamas christyi (Boulenger, 1920)	AMNH 252348, 252329	-	X	X	-	-	X	-	X	X	X	-	-	-	X	X	X
CHARACIFORMES																	
Alestidae (17)																	
Alestes liebrechtsii Boulenger, 1898	AMNH 252337, 254612	-	-	X	-	X	-	-	-	X	-	-	-	-	-	-	X
Alestopetersius caudalis (Boulenger, 1899)	AMNH 254674, 252359	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X

TABLE 2. ***CONTINUED.***

TAXON	AMNH Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Alestopetersius tumbensis Hoedeman, 1951	AMNH 252336	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Brachypetersius altus (Boulenger, 1899)	AMNH 254673, 250983	-	-	-	-	X	-	-	-	X	-	-	X	-	-	-	X
Brycinus comptus (Roberts and Stewart, 1976)	AMNH 252333, 252369	-	X	X	-	X	-	-	X	X	-	-	-	-	-	-	-
***Brycinus grandisquamis* (Boulenger, 1899)**	AMNH 254605, 254670	-	-	-	-	X	-	-	-	-	-	-	X	-	-	-	X
Brycinus imberi (Peters, 1852)	AMNH 255363, 245525	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Brycinus macrolepidotus Valenciennes, 1850	AMNH 255364, 245525	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Bryconaethiops boulengeri Pellegrin, 1900	AMNH 252335, 254596	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	X
Bryconaethiops microstoma Günther, 1873	AMNH 252334, 254616	-	-	X	-	X	-	-	-	X	-	-	-	-	-	-	X
Hydrocynus vittatus Castelnau, 1861	AMNH 252406, 252370	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	X
Micralestes acutidens (Peters, 1852)	AMNH 254594, 252347	-	X	X	-	X	X	-	X	X	X	-	X	X	-	-	X
***Micralestes humilis* Boulenger, 1899**	AMNH 254677	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
Micralestes lualabae Poll, 1967	AMNH 250730, 250761	-	-	X	-	-	-	-	-	X	-	-	X	-	-	-	X
Micralestes stormsi Boulenger, 1902	AMNH 254595, 252349	-	X	-	-	-	X	X	-	X	X	X	X	X	-	-	X
Phenacogrammus aurantiacus (Pellegrin, 1930)	AMNH 255340	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Phenacogrammus interruptus (Boulenger, 1899)	AMNH 255365, 254743	X	-	-	X	-	-	-	-	-	-	-	X	X	-	-	X
Hepsetidae (1)																	
Hepsetus odoe (Bloch, 1794)	AMNH 252357, 254685	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X
Citharinidae (2)																	
Citharinus gibbosus Boulenger, 1899	AMNH 254687, 245511	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	X
Citharinus macrolepis Boulenger, 1899	AMNH 245512	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Distichodontidae (9)																	
Distichodus affinis Günther, 1873	AMNH 255367, 255361	X	-	-	X	X	-	X	-	-	-	-	X	-	-	-	X
Distichodus antonii Schilthuis, 1891	AMNH 250972, 255336	X	-	-	X	X	-	-	-	-	-	-	-	-	-	-	X
Distichodus antroventralis Boulenger, 1898	AMNH 250970, 250964	-	-	X	-	X	X	X	-	-	-	-	X	-	-	-	X
Distichodus fasciolatus Boulenger, 1898	AMNH 252364, 252417	-	X	X	-	-	-	-	-	-	-	-	X	-	-	-	X
Distichodus sexfasciatus Worthington and Ricardo, 1937	AMNH 255283, 255368	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Eugnathichthys macroterolepis Boulenger, 1899	AMNH 254533, 245508	-	-	X	-	-	-	X	-	-	-	-	-	-	-	-	X
***Neolebias trilineatus* Boulenger, 1899**	AMNH 254603	-	-	-		X	-	-	-	-	-	-	-	-	-	-	X
Phago boulengeri Schilthuis, 1891	AMNH 254742, 252338	-	-	X	X	X	-	X	-	X	-	-	X	-	-	-	X
Phago intermedius Boulenger, 1899	AMNH 255362	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
SILURIFORMES																	
Claroteidae (8)																	
***Anaspidoglanis macrostoma* (Pellegrin, 1909)**	AMNH 254681	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
Chrysichthys cranchii	observed	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Chrysichthys habereri Steindachner,1912	AMNH 250852, 254584	-	-	X	-	-	X	-	-	X	-	-	-	-	-	-	X
***Chrysichthys ornatus* Boulenger, 1902**	AMNH 254684	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
Nsele "glass catfish" new genus and species	AMNH 254531	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
***Parauchenoglanis balayi* (Sauvage, 1879)**	AMNH 254590, 255264	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	X
Parauchenoglanis monkei (Keilhack, 1910)	AMNH 250764, 252352	-	-	-	-	-	-	-	-	X	-	-	X	X	-	-	X

TABLE 2. ***CONTINUED.***

TAXON	AMNH Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
***Parauchenoglanis punctatus* (Boulenger, 1902)**	AMNH 254689, 250881	-	-	-	-	X	-	-	-	-	-	X	-	-	-	-	X
Schilbeidae (4)																	
Pareutropius debauwi (Boulenger, 1900)	AMNH 252368, 255246	-	X	X	-	X	-	-	X	X	X	-	-	-	-	-	X
Schilbe grenfelli (Boulenger, 1900)	AMNH 252377, 254611	-	-	X	-	X	-	-	-	-	-	-	-	-	-	-	X
Schilbe intermedius Rüppell, 1832	AMNH 252367, 252327	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Schilbe marmoratus Boulenger, 1911	AMNH 252326, 250766	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	X
Clariidae (9)																	
***Channallabes apus* (Günther, 1873)**	AMNH 250752, 250884	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	X
***Clariallabes manyangae* (Boulenger, 1919)**	AMNH 255288	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
***Clariallabes teugelsi* Ferraris, 2007**	AMNH 254591, 250755	-	-	-	-	-	X	-	-	-	-	-	X	-	-	-	X
***Clarias angolensis* Steindachner, 1866**	AMNH 254589, 254536	-	-	-	-	-	X	X	-	-	X	-	-	-	X	X	X
Clarias buthupogon Sauvage, 1879	AMNH 254588, 245556	-	-	X	-	-	X	-	-	-	-	-	-	-	-	-	X
Clarias camerunensis Lönnberg, 1895	AMNH 254737, 255272	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X	X
***Clarias gabonensis* Günther, 1867**	AMNH 250869, 250851	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X
Clarias gariepinus (Burchell, 1822)	AMNH 255334	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
***Clarias platycephalus* Boulenger, 1902**	AMNH 250756, 255294	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	X
Malapteruridae (1)																	
***Malapterurus gossei* Norris, 2002**	AMNH 250916	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	X
Mochokidae (8)																	
***Chiloglanis micropogon* Poll, 1952**	AMNH 250913	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X
Synodontis alberti Schilthuis, 1891	AMNH 255374	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Synodontis angelica Schilthuis, 1891	AMNH 255335	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
Synodontis congica Poll, 1971	AMNH 255375, 252331	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Synodontis contracta Vinciguerra, 1928	AMNH 252421, 254748	-	X	-	X	-	-	X	-	X	-	X	X	-	-	-	X
Synodontis greshoffi Schilthuis 1891	AMNH 252332, 245538	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Synodontis nigriventris David, 1936	AMNH 245536	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	X
Synodontis schoutedeni David, 1936	AMNH 252332, 254747	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X
Amphiliidae (7)																	
***Amphilius maesii* Boulenger, 1919**	AMNH 255273, 255271	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-
Belonoglanis brieni Poll, 1959	AMNH 254741	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X
Belonoglanis tenuis Boulenger, 1902	AMNH 255345, 255291	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X
***Doumea angolensis* (Boulenger, 1906)**	AMNH 254585, 257782	-	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-
***Leptoglanis xenognathus* Boulenger, 1902**	AMNH 249925, 257147	-	-	-	-	-	-	X	-	-	X	-	-	-	-	-	X
***Phractura intermedia* Boulenger, 1911**	AMNH 250950, 250958	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X
***Phractura scaphyrhynchura* (Vaillant, 1886)**	AMNH 250919, 257780	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
SYNBRANCHIFORMES																	
Mastacembelidae (1)																	
Mastacembelus congicus Boulenger, 1896	AMNH 255344, 254539	X	-	-	-	-	-	X	-	-	-	-	-	-	-	-	X
CYPRINODONTIFORMES																	
Nothobranchiidae (3)																	
***Aphyosemion polli* Radda and Pürzl, 1987**	AMNH 254609	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X

TABLE 2. ***CONTINUED.***

TAXON	AMNH Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Epiplatys chevalieri (Pellegrin, 1904)	AMNH 255339, 254736	X	-	-	X	X	-	X	-	-	-	-	-	X	-	-	X
***Epiplatys multifasciatus* (Boulenger, 1913)**	AMNH 254532, 255285	-	-	-	-	-	-	X	-	-	-	-	X	X	-	-	X
Poeciliidae (1)																	
***Poropanchax myersi* (Poll, 1952)**	AMNH 254608, 254668	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
ANABANTIFORMES																	
Anabantidae (4)																	
Ctenopoma gabonense Günther, 1896	AMNH 254740, 250883	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X
Ctenopoma kingsleyae Günther, 1896	AMNH 255346, 254754	X	-	-	X	X	-	X	-	-	-	-	-	-	-	-	X
***Ctenopoma ocellatum* Pellegrin, 1899**	AMNH 254682	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	X
***Microctenopoma nanum* (Günther, 1896)**	AMNH 250936, 250936	-	-	-	-	-	-	-	X	-	X	-	-	-	-	-	X
Channidae (2)																	
***Parachanna insignis* (Sauvage, 1883)**	AMNH 252393	-	-	-	-	-	**X**	-	-	-	-	-	-	-	-	-	**X**
***Parachanna obscura* (Günther, 1861)**	AMNH 254610, 254676	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	X
GOBIIFORMES																	
Eleotridae (1)																	
***Kribia nana* (Boulenger, 1901)**	AMNH 254604, 254530	-	-	-	-	X	-	X	-	-	-	-	-	-	-	-	X
LABRIFORMES																	
Cichlidae (9)																	
Ctenochromis polli (Thys van den Audenaerde, 1964)	AMNH 255349, 254675	X	-	-	-	X	X	-	-	X	-	-	-	-	-	-	X
Hemichromis elongatus (Guichenot,1861)	AMNH 254745, 254679	-	-	-	X	X	X	-	-	-	X	-	X	X	X	X	X
Hemichromis stellifer Loiselle, 1979	AMNH 255337, 254744	X	-	-	X	X	-	-	-	-	-	-	X	-	-	-	X
Heterochromis multidens (Pellegrin, 1900)	AMNH 252351, 254698	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Nanochromis parilus Roberts and Stewart, 1976	AMNH 255348, 254738	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X
Pelmatochromis nigrofasciatus (Pellegrin, 1900)	AMNH 254739, 245577	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-	X
Tilapia sp,	AMNH 254393, 255290	-	-	-	-	-	-	X	-	X	-	-	X	-	-	-	-
Tilapia tholloni (Sauvage, 1884)	AMNH 255358, 252346	X	-	X	X	X	X	X	-	X	-	-	X	-	-	-	X
Tylochromis lateralis (Boulenger, 1898)	AMNH 255351, 252373	X	X	X	-	X	-	-	-	X	-	-	X	-	-	-	X
TETRAODONTIFORMES																	
Tetraodontidae (1)																	
Tetraodon miurus Boulenger , 1902	AMNH 254751, 254537	-	-	X	X	-	-	X	-	X	-	-	-	-	-	-	X

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